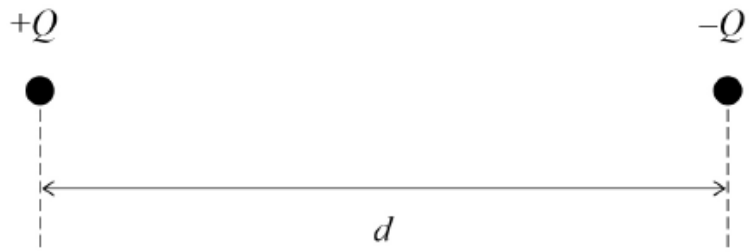
**Electric fields – A2 Physics P2**

**1.** No.14

The diagram shows a particle with charge $+Q$ and a particle with charge $-Q$ separated by a distance $d$.
The particles exert a force $F$ on each other.




An additional charge of $+2Q$ is then given to each particle and their separation is increased to $2d$.

What is the force that now acts between the particles?

**[1 mark]**

**A** an attractive force of $\frac{9}{2}F$ ⬭

**B** an attractive force of $\frac{9}{4}F$ ⬭

**C** a repulsive force of $\frac{3}{2}F$ ⬭

**D** a repulsive force of $\frac{3}{4}F$ ⬭

**2.** No.15

Two protons are separated by distance $r$.
The electrostatic force between the two protons is **X** times the gravitational force between them.

What is the best estimate for **X**?

**[1 mark]**

**A** $10^{20}$ ⬭

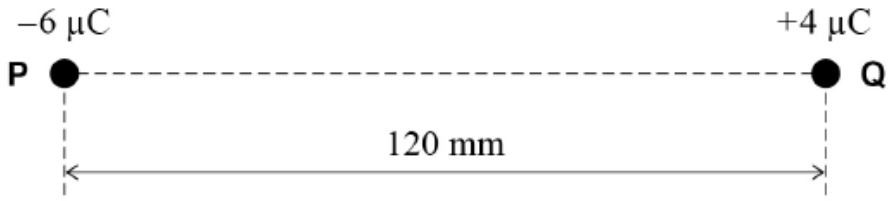
**B** $10^{28}$ ⬭

**C** $10^{36}$ ⬭

**D** $10^{42}$ ⬭

**3.** No.17

Two charged particles **P** and **Q** are separated by a distance of 120 mm.
**X** is a point on the line between **P** and **Q** where the electric potential is zero.




What is the distance from **P** to **X**?

**[1 mark]**

**A** 40 mm ⬭

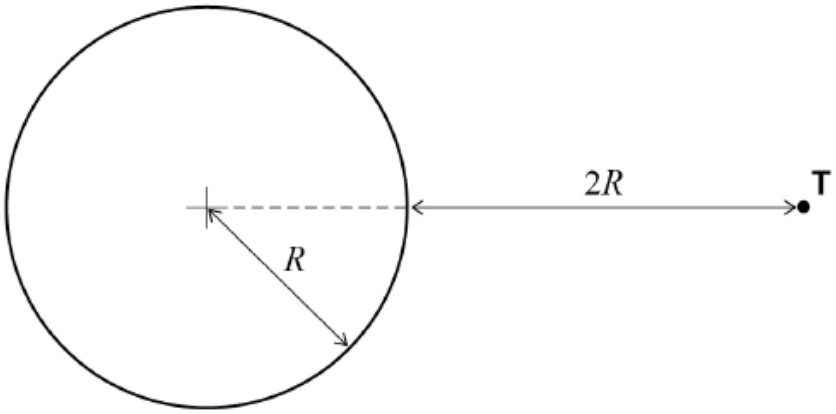
**B** 48 mm ⬭

**C** 60 mm ⬭

**D** 72 mm ⬭

**4.** No.18

An isolated spherical conductor is charged.
The conductor has a radius $R$ and an electric potential $V$. The electric field strength at its surface is $E$.




Point **T** is a distance $2R$ from the surface.

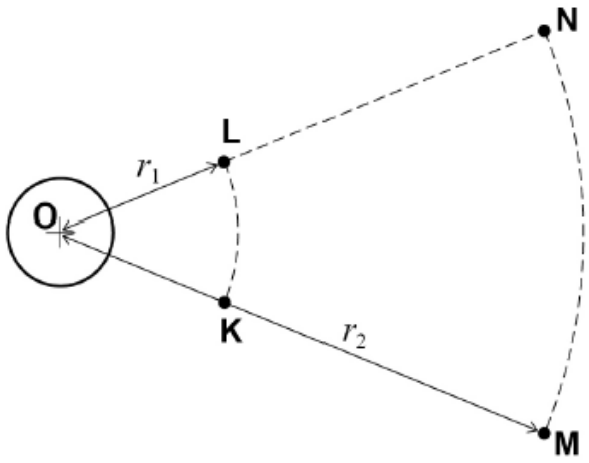
What are the electric field strength and electric potential at **T**?

**[1 mark]**

| | Electric field strength | Electric potential | |
|---|---|---|---|
| **A** | $\frac{E}{2}$ | $\frac{V}{4}$ | ⬭ |
| **B** | $\frac{E}{3}$ | $\frac{V}{9}$ | ⬭ |
| **C** | $\frac{E}{4}$ | $\frac{V}{2}$ | ⬭ |
| **D** | $\frac{E}{9}$ | $\frac{V}{3}$ | ⬭ |

**5.** No.19

**O** is the centre of a negatively charged sphere.




**K** and **L** are two points at a distance $r_1$ from **O**.
**M** and **N** are two points at a distance $r_2$ from **O**.

Which statement is true?

**[1 mark]**

**A** The work done moving an electron from **M** to **K** is the same as that done moving an electron from **K** to **L**. ⬭

**B** The work done moving a positron from **K** to **M** is the same as that done moving an electron from **K** to **M**. ⬭

**C** No work is done moving an electron from **M** to **N**. ⬭

**D** No work is done moving a positron from **L** to **N**. ⬭